BECHTEL JACOBS
Bechtel Jacobs Company LLC

DOE Contract No. DE-AC05-98OR22700
Job No. 23900
September 28, 2000

Mr. W. Don Seaborg
Paducah Site Manager
U. S. Department of Energy
P.O. Box 1410
Paducah, KY 42002-1410

Subject: *Operation and Maintenance Plan for the Surface Water Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE/OR/07-1904&D1)

Dear Mr. Seaborg:

Attached for your use is a draft letter for transmitting the captioned document to the Kentucky Department for Environmental Protection (KDEP) and the U. S. Environmental Protection Agency (EPA). Fourteen copies (seven for KDEP, three for the EPA, and four for the Department of Energy [DOE] Site Office) of the document are being submitted to your office for distribution to the regulatory agencies by September 29, 2000, and for your use. Since this is a secondary document, certification is not required according to the Paducah Federal Facilities Agreement.

Submission of this document completes all required activities for closure of the January 14, 2000, Notice of Violation (NOV) received from the State of Kentucky on the scrapyards silt fence. During a telephone conversation between Mr. Mike Guffey of KDEP, Raul Castaneda, and Debora Jolly, it was agreed that DOE would request a separate letter from KDEP closing the NOV. This approach would ensure timely closure of the NOV in the event that comments on the operations and maintenance plan, if KDEP chooses to submit them, are delayed.

If additional information is desired, please contact Debora Jolly of my staff at (270) 441-5063.

Sincerely,

Gordon L. Dover
Paducah Manager of Projects

GLD:ll
LTR-PAD/EP-LL-00-0076

Attachments: 1. Draft letter to KDEP and EPA
2. Subject document

c: B. Ford, SAIC
F. Johnstone, SAIC
D. R. Jolly
R. E. Scott
M. A. Tagoe
R. R. Veazey
Administrative Record (DOE version)

c/att: File-EMEF-DMC-PAD-RC

Mr. Carl R. Froede Jr., P.G.
United States Environmental Protection Agency
Region IV
DOE Remedial Section
Federal Facilities Branch
Waste Management Division
61 Forsyth Street
Atlanta, Georgia 30303

Mr. Michael V. Welch, P. E.
Manager
Hazardous Waste Branch
Kentucky Department for Environmental Protection
14 Reilly Road, Frankfort Office Park
Frankfort, Kentucky 40601

OPERATION AND MAINTENANCE PLAN FOR THE SURFACE WATER OPERABLE UNIT AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY
(DOE/OR/07-1904&D1)

Dear Mr. Froede and Mr. Welch:

Enclosed for your information is the captioned document. In a letter dated January 14, 2000, the Kentucky Department for Environmental Protection (KDEP) issued a Notice of Violation (NOV) to the Department of Energy (DOE) on the sediment controls around Solid Waste Management Units (SWMUs) 12, 14, and 15 (scrapyards). In response to the NOV, DOE installed four additional silt traps in the ditches in the scrapyards area. These changes have been documented in a revised operation and maintenance (O&M) plan for the Scrapyards Interim Corrective Measure.

During the fall of 1999 through the spring of 2000, a number of areas were identified that met the requirements for radiological posting as specified in 10CFR835. The existing O&M plan for the Interim Corrective Measure for Institutional Controls of Off-Site Contamination in Surface Water was modified to document the types and locations of these additional postings.

DOE is pleased to submit both of these revised O&M plans in the *Operation and Maintenance Plan for the Surface Water Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE/OR/07-1904&D1). The document contains four separate O&M sections. In addition to the two discussed previously, this document also contains O&M plans for the North-South Diversion Ditch Interim Remedial Action and the WAGs 1 and 7 Remedial Action. Combination of all of the Surface Water Operable Unit O&M activities into a single document ensures consistency with the operable unit approach, and minimizes the number of documents in the review cycle. The existing approved O&M plans for each action were rewritten into the document to be consistent with the format found in Appendix D of the Federal Facilities Agreement (FFA). Portions of the FFA outline were not applicable to the types of actions in effect, and these sections were indicated as appropriate.

All activities defined in the approved *Workplan for Maintenance and Upgrade of Scrap Yard Sediment Runoff Containment at the Paducah Gaseous Diffusion Plant* (DOE/OR/07-1865&D1) and in SWMU Notification No. KY8-890-008-982 have been completed. Mr. Mike Guffey performed a walkdown of the scrapyards area on September 19, 2000, and no outstanding issues were identified. DOE requests that separate letters be issued by your office for 1) concurrence with the actions taken and closure of the NOV and 2) comments on the O&M plan, if KDEP chooses to comment on the document.

If you have any questions or require additional information, please call Mr. Dave Dollins at (270) 441-6819.

Sincerely,

W. Don Seaborg
Paducah Site Manager

c/enc: EIC/Kevil

(Redacted)

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received
10/2/00 dv

DOE/OR/07-1904&D1
Secondary Document

Operation and Maintenance Plan for the Surface Water Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Document no longer contains OUO information

OFFICIAL USE ONLY
May be exempt from public release under the Freedom of Information Act (5 U.S.C. 552), Exemption number and category: #2 Circumvention of Statute
Department of Energy review required before public release
Name/Org: Samanda Sys. Date 2/14/07
Guidance (if applicable) N/A

~~This document has received the appropriate reviews for release to the public.~~

REVIEWED FOR CLASSIFICATION
Initials Date
UNCLASSIFIED

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DOE/OR/07-1904&D1
Secondary Document

Operation and Maintenance Plan for the Surface Water Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Date Issued—September 2000

Prepared for the
U.S. Department of Energy
Office of Environmental Management

Environmental Management Activities at the
Paducah Gaseous Diffusion Plant
Paducah, Kentucky 42001
managed by
Bechtel Jacobs Company LLC
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-98OR22700

CONTENTS

CONTENTS (continued)

ACRONYMS

CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
EMEF DMC	Environmental Management Enrichment Facilities Document Management Center
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
ICM	Interim Corrective Measure
KPDES	Kentucky Pollutant Discharge Elimination System
KDEP	Kentucky Department for Environmental Protection
MW	monitoring well
NSDD	North-South Diversion Ditch
O&M	operation and maintenance
PCB	polychlorinated biphenyl
PGDP	Paducah Gaseous Diffusion Plant
PPE	personal protective equipment
PSS	Plant Shift Superintendent
ROD	Record of Decision
SWMU	solid waste management unit
SWOU	Surface Water Operable Unit
UST	underground storage tank
WAG	waste area group

EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) is conducting environmental restoration activities at the Paducah Gaseous Diffusion Plant (PGDP) to address contamination that is the result of historic operations, waste-handling activities, and disposal practices at the plant. This document contains four Operation and Maintenance (O&M) Plans related to response actions taken on the Surface Water Operable Unit (SWOU). The plans in this document replace previously approved documents for these activities. The plans address the Surface Water Institutional Controls Interim Corrective Measure (ICM), the Scrapyards Silt Fence ICM, the North-South Diversion Ditch (NSDD) remedial action, and the Waste Area Groups (WAGs) 1 and 7 remedial action and are found in Sects. 3, 4, 5, and 6, of this document. With the exception of two lift stations installed as part of the NSDD remedial action, "operating" equipment is not being utilized in the surface water response actions. Instead, stationary structures with no moving components were constructed. The result is that this document focuses largely on maintenance, rather than operations. Maintenance on all four of the response actions is largely in the form of mowing around structures and conducting inspections to assure posting are legible. Additional activities include inspecting the Surface Water Institutional Controls ICM fences for structural integrity, replacing the Scrapyards Silt Fence ICM materials (silt fences and associated gabions) every 3 years, and collecting monitoring well data at WAGs 1and 7. Maintenance associated with the NSDD response action includes keeping the components of the water transfer system clear of debris and activating heat tracing on aboveground wiring during cold weather.

1. INTRODUCTION

The U.S. Department of Energy (DOE) is conducting environmental restoration activities at the Paducah Gaseous Diffusion Plant (PGDP) to address contamination that is the result of historic operations, waste-handling activities, and disposal practices at the plant. As part of its efforts, DOE is submitting four Operation and Maintenance (O&M) Plans, within this document, for previously implemented response actions related to the Surface Water Operable Unit (SWOU). The O&M Plans contained in this document address Surface Water Institutional Controls Interim Corrective Measure (ICM), the Scrapyards Silt Fence ICM, the North-South Diversion Ditch (NSDD) remedial action, and Waste Area Groups (WAGs) 1 and 7 remedial action and are found in Sects. 3, 4, 5, and 6, respectively. The plans in this document replace previously approved documents for these activities. Each plan follows the general outline for O&M Plans found in Appendix D of the Federal Facility Agreement (FFA). However it should be noted that the FFA O&M outline appears to have been developed for response actions that employed full-time remediation equipment such as a pump-and-treat system or a vapor extraction system. With the exception of the lift station pumps installed as part of the NSDD remedial action, this type of "operating" equipment is not being utilized in the surface water response actions. Instead, stationary structures with no moving components were constructed. The result is that portions of the FFA-defined O&M outline are not applicable and are labeled as such in the following plans.

2. GENERAL HISTORY

2.1 SURFACE WATER INSTITUTIONAL CONTROLS ICM

In July 1993, DOE implemented an interim measure to reduce potential for exposure to contamination in surface water and sediment in the vicinity of the PGDP. The proposed action is documented in the *Surface Water Institutional Controls ICM Work Plan* (DOE 1992). DOE installed fencing and posted warning signs in areas of contamination to prevent direct human contact with contaminated sediments. DOE has erected similar institutional controls outside the PGDP security fence since the 1993 interim measure; these additional institutional controls also are addressed in this O&M Plan.

2.2 SCRAPYARDS SILT FENCE ICM

In April 1994, DOE placed silt fences around Solid Waste Management Units (SWMUs) 12, 14, and 15, and installed silt traps in two ditches near SWMUs 7 and 30 in the northwest section of the PGDP. The purpose of this measure was to filter the solid UF_4 and uranium-contaminated silt and sediment from the surface water prior to discharge to Bayou Creek. The sediment controls were developed in the *Scrapyards ICM Work Plan* (DOE 1993) and installation was completed in 1994. Recently, additional controls were designed and installed to augment sediment control. The maintenance on structures installed in 1994, and those installed more recently, is addressed under this O&M Plan.

2.3 NSDD INTERIM REMEDIAL ACTION

The NSDD originates within the north central portion of the PGDP and joins with Little Bayou Creek to the north of the plant. Historically, the NSDD received wastewater from the C-400 Cleaning Building. As part of its cleanup effort at the PGDP, DOE, in conjunction with the U.S. Environmental Protection Agency (EPA) and with the concurrence of the Kentucky Department for Environmental

Protection (KDEP), signed the Interim Record of Decision (ROD) for the NSDD (DOE 1994a). The primary objective of the Interim ROD was to begin control of contaminant releases into the NSDD and to mitigate the spread of contamination. Components of the Interim ROD include the following.

- Installation of an ion exchange system in the C-400 Cleaning Building to reduce radionuclide levels in the effluent to be discharged to the NSDD.
- Removal of fly ash from the C-600 Steam Plant effluent discharged to the NSDD.
- Construction of lift stations near the C-400 Building and C-600 Steam Plant and a pipeline to convey flow from the southern end of the ditch to the Ditch 001 Lift Station, where it reenters the NSDD. This action was intended to reduce the potential for mobilizing sediments and to reduce the amount of contaminated water infiltrating the groundwater.
- Construction of a gabion in the NSDD to address the potential for sediment transport from the bypassed portion of the ditch.
- Installation of signs along the ditch to warn plant personnel of elevated levels of radionuclides, metals, and polychlorinated biphenyl (PCB) compounds in the area (DOE 1994a).

The construction of the interim remedial action for the NSDD was completed August 18, 1995. Once construction was completed, two components of the action, the C-400 Ion Exchange and the C-600 Fly Ash Lagoons, were incorporated into the daily operations of the PGDP by United States Enrichment Corporation. The discharge from the C-400 Ion Exchange is routed into the Outfall 008 storm water drain, which eliminated discharges from the C-400 Building into the NSDD. Lagoons constructed at the C-600 facility eliminated fly ash deposition in the NSDD.

2.4 WAGS 1 AND 7 REMEDIAL ACTION

WAGs 1 and 7 consist of nine SWMUs located in the southwest corner of the PGDP. Three are in WAG 1 inside the security fence in the southwest corner. They are SWMU 38, the C-615 Sewage Treatment Plant; SWMU 100, the C-206 Fire Training Area; and SWMU 136, at a known trichloroethene spill site in the C-740 materials yard. No O&M activities occur at SWMUs 38, 100, or 136. Six SWMUs are in WAG 7 located on the DOE reservation outside the security fence southwest of the restricted area boundary. They are SWMUs 130, 131, 132, 133, and 134; five underground storage tanks (USTs) at the C-611 Water Treatment Plant; and SWMU 8, the C-746-K Inactive Sanitary Landfill.

The WAGs 1 and 7 ROD (DOE 1998) was signed by DOE February 20, 1998, and by EPA August 10, 1998. KDEP concurred with the selected remedy in a letter dated June 24, 1998. The WAGs 1 and 7 ROD specified the following activities.

- Signs will be posted at the entrance to the landfill site and along the creeks, visible at any access point to the landfill, that clearly state the potential risks to human health posed by the leachate seeps and contaminated sediments in the creeks.
- Rip-rap will be placed along the creek banks at the apparent seep locations along the unnamed tributary and Bayou Creek to minimize erosion.
- A deed notice and restrictions will be placed in the chain of title to the deed of the property informing potential buyers and/or users of the potential risks to human health and the environment posed by the leachate seeps.

- DOE will continue to monitor four sampling points along Bayou Creek and the unnamed tributary adjacent to the landfill (Note: after revision of the KPDES in 1999 this sampling activity is conducted under the terms of the permit).

- A new well will replace Monitoring Well (MW) 303; monitoring will continue in the new well (MW344).

- The current landfill cap maintenance program will be continued (DOE 1998).

These measures were completed in 1999 and are addressed in this O&M Plan.

3. INSTITUTIONAL CONTROLS OF OFF-SITE CONTAMINATION IN SURFACE WATER

3.1 EQUIPMENT START-UP AND OPERATOR TRAINING

Not applicable to this Interim Action; no treatment system was installed.

3.2 DESCRIPTION OF NORMAL O&M

Task for System operation: Not applicable to this Interim Action; no treatment system was installed.

Task for System Maintenance: Photographs of damaged areas will be taken as necessary. Repairs will be performed to ensure signs do not become obstructed and the demarcations will be in good condition (erect, weed-controlled, and operable gates). Mowing and trimming will occur monthly, or as necessary, to maintain visibility. PGDP has developed an inventory of duplicate signs for replacement, as needed. DOE's contractor or subcontractor will perform all needed maintenance to ensure that the fences will meet the intent of the work plan.

Prescribed treatment or operating conditions: Not applicable to this Interim Action; no treatment system was installed.

Schedule: DOE's contractor or a subcontractor, on a monthly basis, will conduct inspections of all signs and fences.

3.3 DESCRIPTION OF POTENTIAL OPERATING PROBLEMS

Not applicable to this Interim Action; no treatment system was installed.

3.4 DESCRIPTION OF ROUTINE MONITORING AND LABORATORY TESTING

DOE's contractor or subcontractor, on a monthly basis, will conduct inspections of all signs and demarcations (see Figure 1 in Appendix for locations). No sampling or laboratory testing is conducted as part of this Interim Action.

3.5 DESCRIPTION OF ALTERNATE O&M

Not applicable to this Interim Action.

3.6 SAFETY PLAN

Health and Safety Work Permits are issued to personnel who conduct mowing adjacent to institutional controls. These permits describe the requirements to wear appropriate personal protective equipment (PPE) such as steel-toed boots, eye and hearing protection, and company-issued clothing. Equipment is inspected prior to use, and sites are walked-down prior to work to assess for any potential hazards that might impact the mowing. All inspections and maintenance activities are conducted under the Integrated Safety Management System. All work is governed by approved health and safety plans, procedures, and activity hazard analyses.

3.7 DESCRIPTION OF EQUIPMENT

There is no equipment, as such, deployed for this Interim Action. However, there are structures and materials in use, specifically the signs and fences identified by EPA and the Commonwealth of Kentucky in the approved ICM Work Plan. The location of institutional controls erected as part of the 1993 response action are listed below.

A1 C-616 Lagoons
A2 Kentucky Pollutant Discharge Elimination System (KPDES) Outfall 011 and Dykes Road
A3 Little Bayou Creek and McCaw Road
A4 Little Bayou Creek and Anderson Road
A5 KPDES Outfall 001 and New Water Line Road
A6 Little Bayou Creek and Ogden Landing Road
A7 NSDD and Ogden Landing Road
A8 NSDD – PGDP to Ogden Landing Road

The verbiage on the signs at these locations has been changed since 1993, with KDEP's concurrence. The current verbiage can be seen in Figures 2 through 6.

Since the implementation of these institutional controls in 1993, additional institutional controls have been erected outside the PGDP security fence and are maintained under this O&M Plan. Most of these controls were added to comply with 10 CFR 835. The locations where these additional institutional controls have been added are listed below.

B1 SWMU 121 – Old bridge, south of the location generally known as "five points," where concrete rubble was used as fill/support
B2 Creek leaving the west side of the C-616 Lagoon
B3 Old railroad bed and ditch coming from west side of scrapyards – outside security fence
B4 KPDES Outfall 015
B5 SWMU 111-A Concrete Rubble Pile – west of Old Ogden Landing Road, north of Post 43
B6 SWMU 111-B Concrete Rubble Pile – west of Old Ogden Landing Road, north of Post 43
B7 NSDD – PGDP to Ogden Landing Road
B8 SWMU 110 Concrete Rubble Pile – west of Old Ogden Landing Road, east of security fence
B9 SWMU 107 – Outfall 002
B10 SWMU 108 – Little Bayou Creek Crossing

B11 Little Bayou Creek and Ogden Landing Road
B12 NSDD – northeast corner of C-746-T Landfill to MW132 road crossing
B13 Outfall 011 and Dyke Road – west side of road to plant security fence
B14 Outfall 011 and Dyke Road – east of the Institutional Control fence to Little Bayou Creek
B15 NSDD – Department of Justice Excavation Areas – four small areas at C-746-S Landfill

The locations of Institutional Controls maintained under this O&M Plan are annotated on a map found in the Appendix (Figure 1). Two locations listed above, "NSDD - PGDP to Ogden Landing Road" and "Little Bayou Creek and Ogden Landing Road," are covered under both the ICM and 10 CFR 835 postings.

Using the reference numbers in Figure 1, along with Table 1 in the Appendix, the reader can determine the regulatory basis or "driver" for the control, the type of sign posted, and the demarcation type. The verbiage and format of the signs can be seen in Figures 2 through 6.

3.8 RECORDS AND REPORTING

An inspection form will be completed and filed with the PGDP Environmental Management Enrichment Facilities Document Management Center (EMEF DMC) for each monthly inspection. The inspection will include the following information.

- Inspection Criteria
- Corrective Action
- General Remarks
- Photographic and Map Attachments (as necessary)
- Narrative Evaluation

Maintenance cost will be tracked and documented by a DOE contractor project controls specialist. Financial records are retained in the EMEF DMC.

All personnel who perform inspections, mowing, and routine monitoring activities are required to maintain radio contact with the Plant Shift Superintendent (PSS), who has the capability to respond to emergency requests.

3.9 PROJECTED O&M COSTS

O&M cost for this response action is estimated using available historical cost information. DOE's contractor tracks the cost for all four of the SWOU response actions in a single account; it is not feasible to determine actual cost on a response action-specific basis. However, cost generally falls into three categories: 1) routine inspection and monitoring, 2) mowing, and 3) routine and periodic repairs and replacement. The average annual cost for Surface Water Institutional Controls maintenance is projected to be as follows.

TASK	COST
Routine inspection and monitoring	$16,400
Mowing	$15,700
Routine and periodic repairs and replacement	$25,000
TOTAL COST	$57,100

4. SCRAPYARD INTERIM CORRECTIVE MEASURE

4.1 EQUIPMENT START-UP AND OPERATOR TRAINING

Not applicable to Scrapyard ICM: no treatment system was installed.

4.2 DESCRIPTION OF NORMAL O&M

Tasks for system operation: Not applicable.

Tasks for system maintenance: Because this interim measure involves only stationary structures, normal O&M will be limited to inspection of the structures and repair as needed. Maintenance consists of repair and/or replacement of the runoff control structures. Maintenance will occur to assure runoff control measures achieve their intended purpose. Areas adjacent to the silt fence will be mowed at least twice a year. Replacement of the fence and gabion structures is expected to occur every three years.

Prescribed treatment or operating conditions: Not applicable.

Schedule: Inspections will be conducted monthly. Materials will be replaced as needed.

4.3 DESCRIPTION OF POTENTIAL OPERATING PROBLEMS

Not applicable to Scrapyard ICM; no operating system was installed.

4.4 DESCRIPTION OF ROUTINE MONITORING AND LABORATORY TESTING

Monitoring will consist of a visual inspection of all sediment control structures. This inspection will be performed once a month. No sampling or laboratory testing will be conducted under this O&M Plan. However it should be noted that KPDES Outfall 001 is monitored regularly and the data submitted to the Commonwealth of Kentucky monthly (and to EPA, quarterly, under the Institutional Controls Quarterly Report). This is pertinent since the surface-water runoff from these scrapyard SWMUs flows into two ditches that border their northern and western boundaries. The ditches flow westward to KPDES Outfall 001 that discharges into Bayou Creek.

4.5 DESCRIPTION OF ALTERNATE O&M

Alternate O&M is not applicable for this interim measure.

4.6 SAFETY PLAN

Health and Safety Work Permits are issued to personnel conducting mowing of SWMUs. These permits describe the requirements to wear appropriate PPE such as steel-toed boots, eye and hearing protection, and company-issued clothing. Equipment is inspected prior to use and sites are walked-down prior to work to assess any potential hazards that might impact the mowing. All inspections and maintenance activities are conducted under the Integrated Safety Management System. All work is governed by approved health and safety plans, procedures, and activity hazard analyses.

4.7 DESCRIPTION OF EQUIPMENT

No equipment, as such, is employed in the ICM. However, three types of structures were built to meet the intent of the ICM (silt fences, mountable berms, and in-stream rock dikes).

The silt fences and silt traps are designed to filter the surface water runoff and contain the solid UF_4 and uranium-contaminated silt and sediment. Woven geotextile material is used to trap the solid particles. The silt fences are anchored approximately 10.1 to 15.2 cm (4 to 6 inches) into the ground. The fences are anchored into the soil by means of a narrow channel cut into the surface soil. This anchoring prevents underflow beneath the fencing. Earthen berms are built in the roadways where the roadways create breaches in the silt fence perimeter. Gabions are in the bottom of ditches that drain the scrapyards. The silt gabions are designed as a secondary containment mechanism for trapping contaminated silt and sediment and solid UF_4 particles. The silt gabions are constructed to facilitate replacement of the filter material when necessary.

The as-built design associated with the 1994 installation is documented in the *Interim Measures Report and Operation and Maintenance Plan for Containment of Scrap Yard Sediment Runoff at the Paducah Gaseous Diffusion Plant*, DOE/OR/07-1299&D1 (DOE 1994b). The sediment control structures covered in this O&M plan are listed below.

- **Silt Fences:** Approximately 1,280 m (4,200 ft) of silt control fencing surround the scrapyard to prevent sediment originating in the scrapyard from entering the adjacent ditches.

- **Mountable Berms:** Six earthen berms were built on the roadways entering the scrapyard where it was not feasible to construct a silt fence.

- **In-Stream Rock Dikes:** Seven gabion structures were constructed in the ditches that receive runoff water from the scrapyard. Theses structures are placed in the ditches that drain the scrapyards in order to prevent sediment from migrating to nearby Bayou Creek.

  (NOTE: Three gabions were installed during the 1994 construction. In 2000, as a part of the maintenance program, the three original gabions and the silt fence were replaced. In addition, four new gabions were installed to supplement the original structures. As-built drawings showing the current installations are provided in Figure 7).

Figure 8 in the Appendix shows the location and design of the structures to be maintained under this O&M Plan.

4.8 RECORDS AND REPORTING

An inspection report will be completed after each monthly inspection and filed in the EMEF DMC.

Maintenance cost will be tracked and documented by a DOE contractor project controls specialist. Financial records are retained in the EMEF DMC.

All personnel who perform inspections, mowing, and routine monitoring activities are required to maintain radio contact with the PSS, who has the capability to respond to emergency requests.

4.9 PROJECTED O&M COST

O&M cost for this response action is estimated using historical cost. DOE's contractor tracks the cost for all four of the SWOU response actions in a single account and, in some cases, it is not feasible to determine actual cost on response action-specific basis. However, for this action, cost falls into four categories: 1) routine inspection and monitoring, 2) mowing, 3) routine and periodic repairs and replacement, and 4) corrective maintenance. Using this information, the average annual cost for Scrapyard Interim Corrective Measure maintenance is projected to be as follows.

TASK	COST
Routine inspection and monitoring	$ 16,400
Mowing	$ 15,200
Routine and periodic repairs and replacement*	$ 76,000
Corrective maintenance	$ 25,000**
TOTAL COST	$132,800

*Assumes replacement every three years.
**Estimated yearly on an as-need basis.

5. NORTH-SOUTH DIVERSION DITCH INTERIM REMEDIAL ACTION

5.1 EQUIPMENT START-UP AND OPERATOR TRAINING

The *Interim Measures Report and Operation and Maintenance Plan for the North-South Diversion Ditch Interim Corrective Measures at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1425&D1 (DOE 1995), summarizes the as-built construction and implementation of the interim actions. A summary of the work completed and a chronology of construction activities are included in the above referenced document. Inspections and maintenance are performed by DOE contractors and subcontractors. All personnel working on these tasks have completed the PGDP General Employee Training program and are trained on all pertinent safety programs.

5.2 DESCRIPTION OF NORMAL O&M

The lift stations identified in Section 5.7 are fully automated. Daily inspections are conducted by a DOE contractor, or subcontractor, to ensure the lift station screens remain clean, the lift stations are operational, and the pipeline is not leaking. Heat tracing installed on the aboveground piping is activated in the fall and deactivated in the spring. The warning signs along the ditch also are inspected as part of this daily routine. The area adjacent to the pipeline and warning signs is mowed twice during the summer months.

5.3 DESCRIPTION OF POTENTIAL OPERATING PROBLEMS

Screens on lift station sumps could become obstructed with debris. In such a situation, debris will be manually removed. Piping could develop a leak or lift station pumps could fail. In these situations, the defective equipment or materials will be repaired or replaced.

5.4 DESCRIPTION OF ROUTINE MONITORING AND LABORATORY TESTING

Monitoring consists of a visual inspection of vaults, pumps, piping, and diversion dams. This inspection is performed once a day. No sampling or laboratory testing will be conducted under this O&M Plan.

5.5 DESCRIPTION OF ALTERNATE O&M

Not applicable to this Interim Action.

5.6 SAFETY PLAN

Health and Safety Work Permits are issued to personnel conducting maintenance on the NSDD. The content of these permits will vary from task to task but, at a minimum, the permits describe the requirements to wear appropriate PPE such as steel-toed boots, eye and hearing protection, and company-issued clothing. All inspections and maintenance activities are conducted under the Integrated Safety Management System. All work is governed by approved health and safety plans, procedures, and activity hazard analyses.

5.7 DESCRIPTION OF EQUIPMENT

The equipment, materials, and structures installed as part of this response action include two lift stations (C-400-L and C-616-C), transfer piping, diversion dams, and institutional controls.

The lift stations consist of below-grade concrete vaults that serve as sumps to collect water flowing in the ditch. Both vaults contain two electric pumps that transfer the water from the vaults to the transfer piping.

There are approximately 457 m (1,500 feet) of welded steel transfer piping. Some of the transfer piping is above ground and some is buried. Aboveground piping that does not gravity drain is insulated and heat traced to prevent freeze damage.

There are three diversion dams. Two of the dams, one located immediately upstream of the highly contaminated section of ditch, the other immediately down stream, are constructed of earth and rip-rap. These dams minimize the flow of water into or out of the highly contaminated portion of the ditch. The third dam, made of concrete, is situated in the ditch near the plant perimeter fence. This dam minimizes the amount of NSDD water flow off plant property. Signs posted at 2.4- to 3-m (8- to 10-ft) wide intervals along the length of the ditch define it as a radiologically contaminated area and an area containing metals and PCBs. In fiscal year 2000, radiological postings were added to the NSDD in accordance with 10 CFR 835 requirements.

These features are annotated on Figure 9 in the Appendix.

5.8 RECORDS AND REPORTING

An inspection form will be completed and filed with the EMEF DMC for each daily inspection.

Maintenance cost will be tracked and documented by a DOE contractor project controls specialist. Financial records are retained in the EMEF DMC.

All personnel who perform inspections, mowing, and routine monitoring activities are required to maintain radio contact with the PSS, who has the capability to respond to emergency requests.

5.9 PROJECTED O&M COSTS

O&M cost for this response action can be estimated by using historical costs. DOE's contractor tracks the cost for all four of the SWOU response actions in a single account and it is not feasible to separate the cost on a response-specific basis. However, for this action, cost generally falls into three categories: 1) routine inspection and monitoring, 2) mowing, and 3) repairs and replacement. Using this information, the average annual cost for the NSDD Remedial Action is projected to be as follows.

TASK	COST
Routine inspection and monitoring	$16,700*
Mowing	$14,300
Routine and periodic repairs and replacement	$25,000
TOTAL COST	$56,000

*Includes monthly inspection and lift station screen cleaning.

6. WAGS 1 AND 7 REMEDIAL ACTION

6.1 EQUIPMENT START-UP AND OPERATOR TRAINING

Not applicable to WAGs 1 and 7; no treatment system was installed.

6.2 DESCRIPTION OF NORMAL O&M

Tasks for system operation: Not applicable.

Tasks for system maintenance:

- All SWMUs: Mowing the grass/weed control in and around the SWMU as appropriate.
- SWMUs 130, 132, 133, and 134: Maintaining "Out of Service UST" signs. (Note: SWMU 131 was determined not to exist.)
- SWMU 8: Maintaining warning signs and an entrance sign.

The locations of these SWMUs are shown in Figure 10 of the Appendix.

Prescribed treatment or operating conditions: Not applicable.

Frequency: Mowing/weed control is performed monthly during April through September at C-746-K. Mowing/weed control will be performed three times during April through September at all other sites. Signs are inspected annually and replaced as needed. The verbiage and format of the signs posted at C-746-K are shown in Figures 11 and 12 in the Appendix.

6.3 DESCRIPTION OF POTENTIAL OPERATION PROBLEMS

Not applicable to WAGs 1 and 7; no treatment system was installed.

6.4 DESCRIPTION OF ROUTINE MONITORING AND LABORATORY TESTING

6.4.1 Groundwater monitoring

a. SWMU 8. MW301, MW302, MW304, and MW344 have a water sample collected quarterly and analyzed for the following parameters.

1,1,1-trichloroethane	iron
1,1,2-trichloroethane	lead
1,1-dichloroethane	magnesium
alpha activity	pH
aluminum	potassium
arsenic	silica
barium	silicon
benzene	sodium
beta activity	strontium
bromodichloromethane	suspended solids
cadmium	technetium-99
carbon tetrachloride	temperature
chloroform	tetrachloroethene
chromium, hexavalent	toluene
cis-1,2-dichloroethene	*trans*-1,2-dichloroethene
conductivity	trichloroethene
depth to water	uranium
dissolved oxygen	vinyl chloride
ethylbenzene	xylene

b. SWMU 38. Water level is measured in MW316 annually, and the water level is measured in MW327 monthly.

c. SWMU 100. Water level is measured in MW330 and MW315 annually.

d. SWMU 136. Water level is measured in MW325 monthly, and the water level is measured in MW326 annually.

Monitoring well locations and associated SWMUs can be seen in Figure 13 of the Appendix.

6.4.2 Surface water monitoring

SWMU 8. As part of the approved PGDP Watershed Monitoring Plan, fish and macroinvertebrate communities are sampled annually in the fall at three locations in Bayou Creek. Water quality is assessed at each site following standard procedures outlined by EPA. Analyses of the data include general descriptive and parametric statistics to evaluate trends in temporal and spatial changes.

6.5 DESCRIPTION OF ALTERNATE O&M

Not applicable to WAGs 1 and 7; no treatment system was installed.

6.6 SAFETY PLAN

Health and Safety Work Permits are issued to personnel conducting mowing of SWMUs. These permits describe the requirements to wear appropriate PPE such as steel-toed boots, eye and hearing protection, and company-issued clothing. Equipment is inspected prior to use, and sites are walked-down prior to work to assess for any potential hazards that might impact the mowing. Groundwater monitoring and surface water monitoring activities are identified in the Health and Safety Plan for Environmental Monitoring at PGDP. This plan outlines requirements to wear safety glasses, steel-toed boots, and gloves when working. Leather gloves are required when working with monitoring equipment and surgical gloves are required when collecting samples and measurements. All inspections and maintenance activities are conducted under the Integrated Safety Management System. All work is governed by approved health and safety plans, procedures, and activity hazard analyses.

6.7 DESCRIPTION OF EQUIPMENT

Tractor mowers and bush-hogs, in conjunction with hand-held grass trimmers, are used for mowing. This equipment is maintained by the maintenance subcontractor and replaced as necessary to perform the mission.

Electric water-level readers and micro-purge pumps are used to measure and sample wells. The water-level readers are maintained by the environmental monitoring subcontractor and replaced as necessary to perform the mission. Bladder pumps are installed in the individual wells and are replaced as necessary to perform the mission.

6.8 RECORDS AND REPORTING

Daily operating logs: Kept by DOE's maintenance and environmental monitoring subcontractors as internal documents. Inspection reports are submitted by the subcontractor and maintained in the EMEF DMC.

Laboratory records: Recorded in the PGDP Oak Ridge Environmental Information System database and available to regulatory agencies. Results of routine monitoring are reported to regulatory agencies in the DOE PGDP FFA progress reports. Results of the surface water monitoring are reported annually every April in the *Paducah Watershed Monitoring Report*.

Maintenance cost will be tracked and documented by a DOE contractor project controls specialist. Financial records are retained in the EMEF DMC.

Mechanism for reporting emergencies: All personnel who perform inspections, mowing, and routine monitoring activities are required to maintain radio contact with the PSS, who has the capability to respond to emergency requests.

6.9 PROJECTED O&M COSTS

Future O&M cost for this response action can be estimated using historical data. DOE's contractor tracks the cost for all four of the SWOU response actions in a single account, and it is not feasible to

determine actual cost on a response action-specific basis. However, for this action, cost generally falls into three categories: 1) routine inspection and monitoring, 2) mowing, and 3) repairs and replacement. Using this information, the average annual cost for WAGs 1 and 7 maintenance is projected to be as follows.

TASK	COST
Routine inspection and monitoring	$16,400
Mowing	$ 7,900
Routine and periodic repairs and replacement	$25,000
TOTAL COST	$49,300

7. REFERENCES

DOE 1992. *Interim Corrective Measure Workplan for Institutional Control of Offsite Contamination in Surface Water,* DOE-OR-1057, U.S. Department of Energy, Paducah, KY, August.

DOE 1993. *Interim Corrective Measures Work Plan for Containment of Scrap Yard Sediment Runoff at the Paducah Gaseous Diffusion Plant,* DOE/OR/06-1114&D2, U.S. Department of Energy, Paducah, KY, May.

DOE 1994a. *Record of Decision for Interim Action Source Control at the North-South Diversion Ditch, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/06-1213&D3, U.S. Department of Energy, Paducah, KY, March.

DOE 1994b. *Interim Measures Report and Operation and Maintenance Plan for Containment of Scrap Yard Sediment Runoff at the Paducah Gaseous Diffusion Plant,* DOE/OR/07-1299&D1, U.S. Department of Energy, Paducah, KY, August.

DOE 1998. *Record of Decision for Waste Area Groups 1 and 7 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/06-1470&D3, U.S. Department of Energy, Paducah, KY, February.

EPA 1998. *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant,* U.S. Environmental Protection Agency, Region 4, Atlanta, GA, February 13.

APPENDIX

Table 1. Cross-referenced institutional controls outside the PGDP security fence to be maintained under the SWOU O&M Plan

Map ref. No.	Description	Driver	Sign type posted	Demarcation/ Barrier type
A1	C-616 Lagoons	ICM	e	Woven wire
A2	Outfall 011 and Dyke Road	ICM	e	Woven wire
A3	Little Bayou Creek and McCaw Road	ICM	e	Woven wire
A4	Little Bayou Creek and Anderson Road	ICM	e	Woven wire
A5	KPDES Outfall 001 and New Water Line Road	ICM	e	Woven wire
*A6	Little Bayou Creek and Ogden Landing Road	ICM	e	Woven wire
A7	N-S Diversion Ditch and Ogden Landing Road	ICM	e	Woven wire
*A8	N-S Diversion Ditch – PDGP to Ogden Landing Road	ICM	e	Yellow and magenta chain
B1	SWMU 121 – Old bridge on Rice Springs Road	835	c, d	Yellow and magenta chain
B2	Creek leaving the west side of the C-616 Lagoon	835	a, d	Yellow and magenta chain
B3	Old railroad bed and ditch near NW corner of PGDP	835	a, d	Yellow and magenta chain
B4	KPDES Outfall 015	835	a, d	Yellow and magenta chain
B5	SWMU 111a Concrete Rubble Pile	835	c, d	Yellow and magenta chain
B6	SWMU 111b Concrete Rubble Pile	835	c, d	Yellow and magenta chain
*B7	N-S Diversion Ditch – PDGP to Ogden Landing Road	835	a, d	Yellow and magenta chain
B8	SWMU 110 Concrete Rubble Pile	835	c, d	Yellow and magenta chain
B9	SWMU 102 – Outfall 002	835	b, d	Yellow and magenta chain
B10	SWMU 108	835	a, d	Yellow and magenta chain
*B11	Little Bayou Creek and Ogden Landing Road	835	a, d	Yellow and magenta chain
B12	N-S Diversion Ditch – north of C-746-T	835	a, d	None
B13	Outfall 011 Ditch and west of Dyke Road	835	a, d	Yellow and magenta chain
B14	Outfall 011 Ditch and east of Dyke Road	835	a, d	Yellow and magenta chain
B15	N-S Diversion Ditch – west of C-746-S	835	b	Yellow and magenta chain

*Indicates the location is posted/fenced for the ICM and for 10 CFR 835.

Ref. No.: This number can be used to cross reference with Fig. 1.

Description: An abbreviated description of the location; more detail can be found in Section 3.7.

Driver: ICM-Interim Corrective Measure Work Plan for Institutional Control of Offsite Contamination in Surface Water
10 CFR 835

Sign type: a. "Contamination Area" radiological warning sign
b. "Underground Radioactive Material Area" radiological warning sign
c. "Fixed Contamination Area" radiological warning sign
d. "10 CFR 835" explanation sign
e. "Plain Language" warning sign for waterways

Fence type: Woven wire – steel woven wire fence
Yellow and magenta – a single strand of light-weight steel chain that is yellow and magenta in color

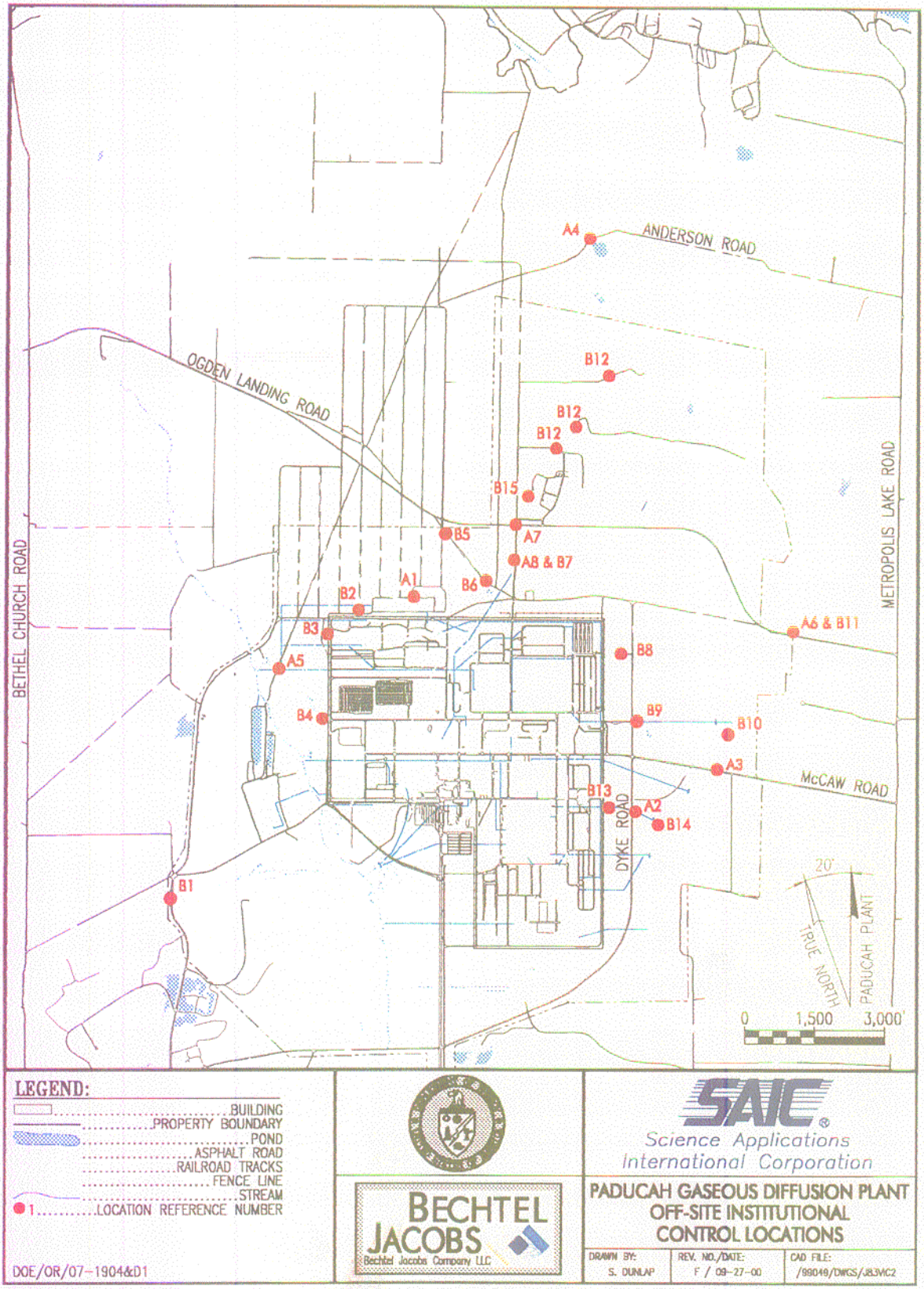
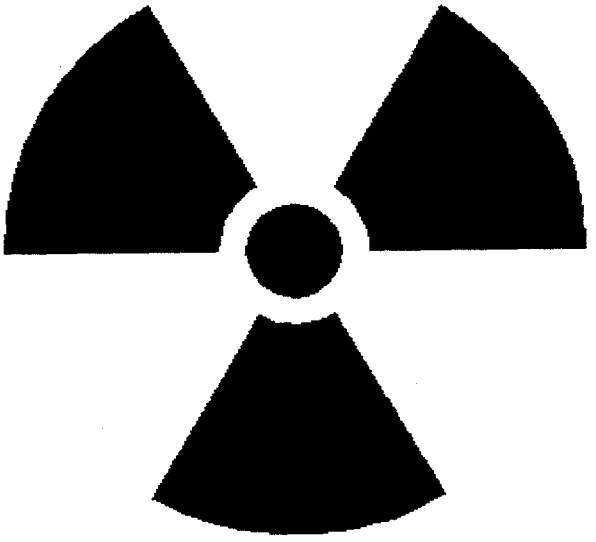

ANDERSON ROAD
OGDEN LANDING ROAD
BETHEL CHURCH ROAD
METROPOLIS LAKE ROAD
McCAW ROAD
DYKE ROAD
A4
B12
B12
B12
B15
A7
B5
A8 & B7
B6
A1
B2
B3
A5
B4
B1
A6 & B11
B8
B9
B10
A3
B13
A2
B14
20°
TRUE NORTH
PADUCAH PLANT
0
1,500
3,000'
LEGEND:
BUILDING
PROPERTY BOUNDARY
POND
ASPHALT ROAD
RAILROAD TRACKS
FENCE LINE
STREAM
1 LOCATION REFERENCE NUMBER
DOE/OR/07-1904&D1
BECHTEL JACOBS
Bechtel Jacobs Company LLC
SAIC
Science Applications International Corporation
PADUCAH GASEOUS DIFFUSION PLANT
OFF-SITE INSTITUTIONAL CONTROL LOCATIONS
DRAWN BY: S. DUNLAP
REV. NO./DATE: F / 09-27-00
CAD FILE: /99049/DWGS/J83MC2

Fig. 1

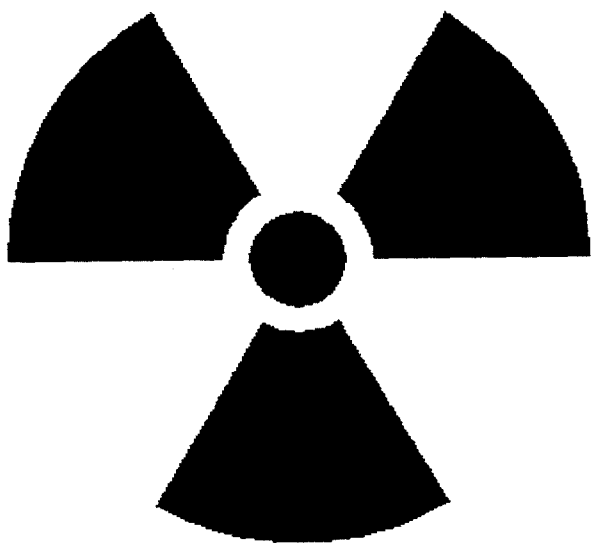
CAUTION



CONTROLLED AREA
CONTAMINATION AREA
TLD REQUIRED
RWP REQUIRED
CONTACT HP PRIOR TO ENTRY

Fig. 2

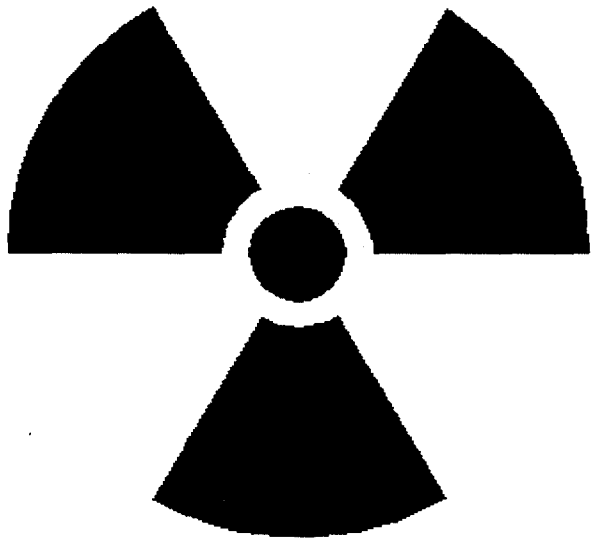
CAUTION



UNDERGROUND RADIOACTIVE MATERIAL AREA TLD REQUIRED CONTACT HP PRIOR TO DISTURBING SURFACES

Fig. 3

CAUTION



CONTROLLED AREA

FIXED CONTAMINATION AREA

TLD REQUIRED
CONTACT HP PRIOR TO DISTURBING ANY SURFACES

Fig. 4

DOE CONTROL AREA

ACCESS TO THIS AREA IS CONTROLLED FOR COMPLIANCE WITH 10 CFR 835 IN ORDER TO PROTECT INDIVIDUALS FROM EXPOSURE TO IONIZING RADIATION

TLD REQUIRED FOR ENTRY

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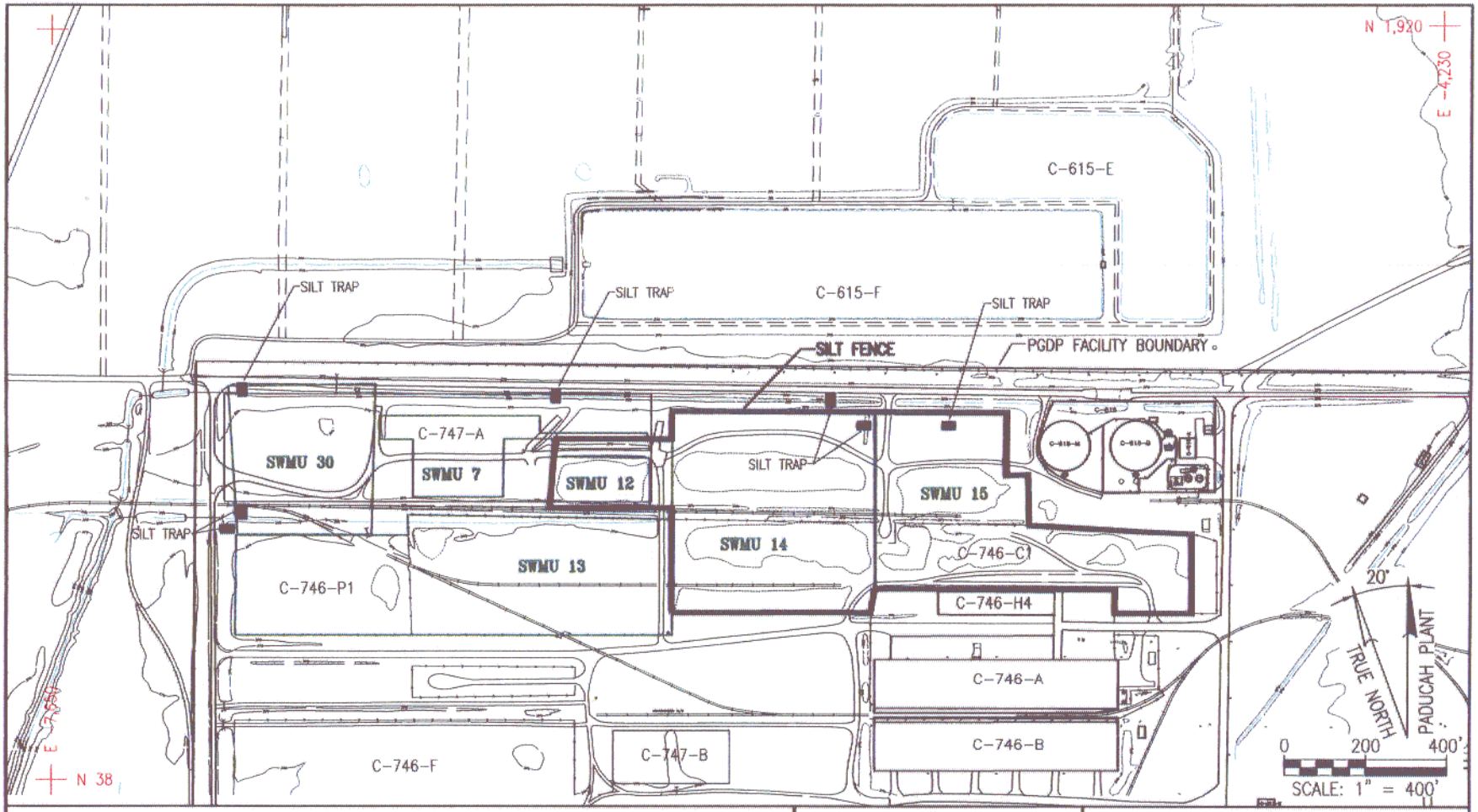
Fig. 5

This waterway is contaminated.
Use of this waterway for drinking, fishing, swimming, or other forms of recreation may expose you to unnecessary health risks.
Do not eat fish caught in this body of water.
Do not cross posted boundaries.
Cross only in designated areas.

For information, call (270) 441-5023

Fig. 6

27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E 4,230
C-615-E
C-615-F
SILT TRAP
SILT TRAP
SILT TRAP
SILT FENCE
PGDP FACILITY BOUNDARY
C-747-A
SWMU 30
SWMU 7
SWMU 12
SILT TRAP
SWMU 15
SILT TRAP
SWMU 14
C-746-C1
SWMU 13
C-746-P1
C-746-H4
C-746-A
C-746-B
C-747-B
C-746-F
E 3,550
N 38
20°
TRUE NORTH
PADUCAH PLANT
0
200
400'
SCALE: 1" = 400'
LEGEND:
SWMU LOCATION
PGDP FACILITY BOUNDARY
ASPHALT ROAD
GRAVEL ROAD
RAILROAD TRACKS
FENCE LINE
STREAM
POND
INDEX CONTOUR (5' INTERVAL)
SILT TRAP
SOURCE:
SILT TRAP LOCATIONS FROM TETRA TECH, INC DRAWING #C5EC74600A002, 1-13-00.
DOE/OR/07-1904&D1
BECHTEL JACOBS
Bechtel Jacobs Company LLC
SAIC
Science Applications International Corporation
PADUCAH GASEOUS DIFFUSION PLANT
SWMUs 12, 14 & 15
DRAWN BY: S. DUNLAP
REV. NO./DATE: B / 09-21-00
CAD FILE: /99049/DWGS/J83SILT

Fig. 8

29

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PADUCAH GASEOUS DIFFUSION PLANT

INACTIVE SANITARY LANDFILL

C-746-K SOLID WASTE MANAGEMENT UNIT 8

DANGER: U.S. DEPARTMENT OF ENERGY
OPERATOR: BECHTEL JACOBS COMPANY LLC
HOURS OF OPERATION: CLOSED
PERMIT NO. KY8-890-008-982
EMERGENCY PHONE NO. 441-6211

Fig. 11

WARNING

THIS STREAM BANK AND STREAM SEGMENTS ADJACENT TO THIS CLOSED LANDFILL HAVE BEEN DETERMINED TO BE UNFIT FOR DRINKING RECREATIONAL OR FISHING PURPOSES

Fig. 12

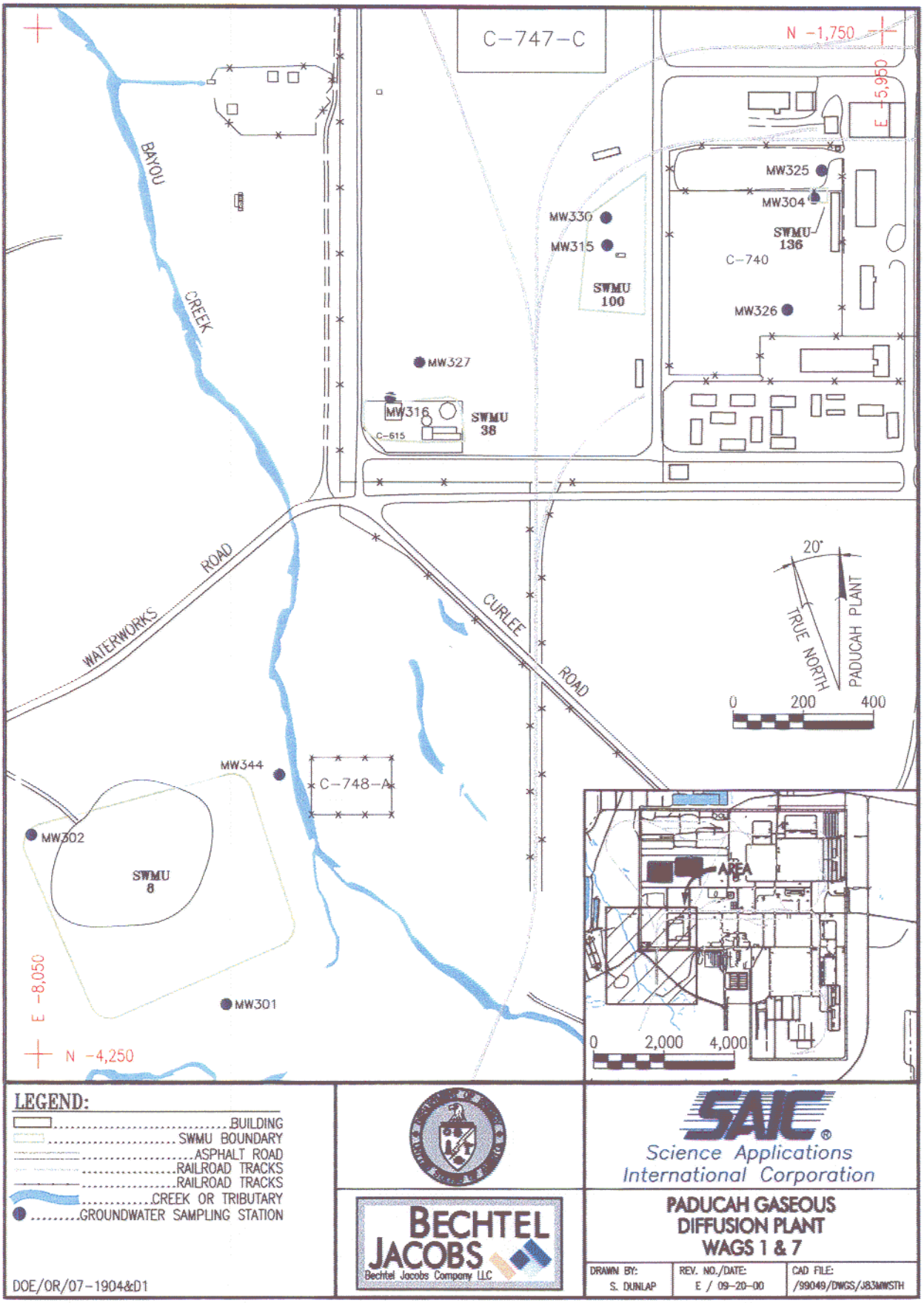
C-747-C
N -1,750
E -5,950
BAYOU
CREEK
MW325
MW304
MW330
MW315
SWMU 136
C-740
SWMU 100
MW326
MW327
MW316
C-615
SWMU 38
WATERWORKS
ROAD
CURLEE
ROAD
20°
TRUE NORTH
PADUCAH PLANT
0
200
400
MW344
C-748-A
MW302
SWMU 8
AREA
E -8,050
MW301
N -4,250
0
2,000
4,000
LEGEND:
BUILDING
SWMU BOUNDARY
ASPHALT ROAD
RAILROAD TRACKS
RAILROAD TRACKS
CREEK OR TRIBUTARY
GROUNDWATER SAMPLING STATION
DOE/OR/07-1904&D1
BECHTEL JACOBS
Bechtel Jacobs Company LLC
SAIC
Science Applications International Corporation
PADUCAH GASEOUS DIFFUSION PLANT
WAGS 1 & 7
DRAWN BY: S. DUNLAP
REV. NO./DATE: E / 09-20-00
CAD FILE: /99049/DWGS/J83MWSTH

Fig. 13